

CLAIMS

What is claimed is:

1. A differential assembly comprising:

a housing portion having a generally annular wall with a generally annular inner surface, said generally annular wall defining an open end of said housing portion; a lid fixedly attached to said open end forming an enclosure with said housing portion;

opposing side bevel gears in driving engagement with at least one bevel pinion assembly having at least one bevel pinion shaft with opposing axial ends each supporting a side bevel gear, said bevel pinion assembly and said side bevel gears being disposed within said enclosure; and

said annular inner surface defining at least two receptors each engaging one axial end of said pinion shaft at spaced locations from said lid, wherein said inner surface defines an ingress for each receptor for inserting said axial end of said pinion shaft.

2. An assembly as set forth in claim 1, wherein said ingress comprises a beveled edge for inserting said axial end of said pinion shaft into said receptor.

3. An assembly as set forth in claim 1, wherein said ingress defines a slot extending inwardly from said open end for inserting said axial end of said pinion shaft into said receptor.

4. An assembly as set forth in claim 1, wherein each of said receptors define a flange extending outwardly from said generally annular wall and encircling said receptors.

5. An assembly as set forth in claim 4, wherein said flange defines an opening through said generally annular wall.

6. An assembly as set forth in claim 1, wherein said generally annular wall includes a first thickness and a second thickness greater than said first thickness, said receptors being disposed in said generally annular wall proximate said second thickness.

7. An assembly as set forth in claim 6, wherein said housing portion includes a protuberance encircling said generally annular wall defining said second thickness and said receptors being disposed in said protuberance.

8. An assembly as set forth in claim 1, wherein said generally annular inner surface defines a splined portion.

9. An assembly as set forth in claim 1, wherein said pinion shaft includes a length and said inner surface of said annular wall includes a diameter greater than said length of said pinion shaft enabling said axial ends of said pinion shaft to be inserted into said receptors.

10. An assembly as set forth in claim 1, wherein said lid defines a lid splined shaft opening and said housing portion defines a housing splined shaft opening, said splined shaft openings having a common axis.

11. An assembly as set forth in claim 1, wherein said lid defines a seam with said housing portion, said seam being sealed with a laser weld bead.

12. An assembly as set forth in claim 1, further including at least two bevel pinion assemblies each being in driving engagement with said side bevel gears.

13. An assembly as set forth in claim 1, wherein said generally annular wall includes a scoop for funneling fluid into said enclosure.

14. An assembly as set forth in claim 13, wherein said generally annular wall includes an outlet for evacuating fluid from said enclosure.

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15. A method of making a differential mechanism comprising the steps of:
 - providing a housing preform having an inner surface and at least one open end;
 - placing said housing preform over a spinning chuck having a plurality of projections;
 - cold-working said housing preform by at least one of spin-forming and flow-forming an inner surface of said housing preform over said chuck and a plurality of projections disposed in said chuck thereby forming receptors into said inner surface of said housing at locations spaced from said open end;
 - providing a lid having cooperable dimensions with said open end of said housing preform;
 - providing a differential gear assembly having a plurality of spline gears supported by at least one spline shaft;
 - inserting said differential gear assembly into said housing, wherein said at least one spline shaft is pivotally supported by said receptors independent of said lid; and
 - securing said lid to said open end of said housing thereby enclosing said differential gear assembly.

16. The method as set forth in claim 13, further including the step of forming said lid with a die press.

17. The method as set forth in claim 13, wherein said step of securing said lid to said die press is further defined by laser welding said lid to said housing.

18. The method as set forth in claim 17, wherein said step of laser welding said lid to said housing is further defined by laser welding a seam defined between said lid and said housing.

19. The method as set forth in claim 18, further including the step of providing a ring gear.

20. The method as set forth in claim 19, further including the step of securing said ring gear to said housing in an overlapping relationship with said seam defined between said lid and said housing.

21. The method as set forth in claim 19, further including the step of securing said ring gear to said housing by laser welding said ring gear to said housing.

22. The method as set forth in claim 13, further including the step of deforming said housing inwardly thereby securing said differential gear assembly in said housing.

23. The method as set forth in claim 13, further including the step of forming an ingress in said inner surface of said housing for inserting said differential gear assembly.

24. The method as set forth in claim 13, further including the step of forming an a bead around said housing increasing a thickness of said housing proximate said receptors.

25. The method as set forth in claim 13, further including the step of forming a flange around said receptors.

26. The method as set forth in claim 13, further including the step of forming splines in said inner surface of said housing.

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27. A differential assembly for a transmission having lubricant flowing therethrough, comprising:

a housing portion having a generally annular wall defining an open end of said housing portion;

a lid fixedly attached to said open end of said housing portion defining an enclosure with said housing portion;

a gear assembly disposed within said enclosure, wherein said gear assembly includes opposing side gears in driving engagement with at least one bevel pinion assembly having a shaft received by receptors disposed in said generally annular wall; and

a scoop formed in said generally annular wall providing an inlet for the lubricant flowing throughout the transmission to enter the housing portion thereby lubricating the gear assembly disposed within the housing portion.

28. An assembly as defined in claim 27, wherein said scoop opens opposite a direction of rotation of said differential inside the transmission.

29. An assembly as defined in claim 28, including an outlet providing an exit for transmission fluid entering said enclosure through said scoop.

30. An assembly as defined in claim 29, wherein said outlet opens in a same direction of rotation of said differential inside the transmission.

31. An assembly as defined in claim 27, wherein said scoop and said outlet are spaced between said receptors.